

ABSTRACT OF THE DISCLOSURE

A light beam emitted from a semiconductor-laser light source is projected onto a diffraction-grating scale after passing through a collimator lens, a beam splitter and a central portion of an annular reflection grating. Two diffracted light beams reflected from the diffraction-grating scale are projected onto the annular reflection grating. The annular reflection grating diffracts the light beams projected onto all portions thereon to a substantially original direction to be projected onto and diffracted from the same position on the diffraction-grating scale. The diffracted light beams are superposed and the resultant light beam is returned to the beam splitter. The light beam is guided by the beam splitter in a direction different from the semiconductor-laser light source, and is detected by a photosensor as an interference light beam. Even if the oscillation wavelength of the semiconductor-laser light source changes, for example, due to a change in the temperature environment, to change the diffraction angles of the diffracted light beams, the light beams are diffracted with original diffraction angles by the annular reflection grating, the position of rediffraction by the diffraction-grating scale and the state of emitted light beams are invariable.

Hence, the state of interference is stable.